SECTION 212
STRUCTURE, ROCK, AND WET EXCAVATION

212.1-DESCRIPTION:

This work shall consist of the excavation and backfill or disposal of all materials required to be removed for the construction of retaining walls, box culverts, catch basins, drop inlets, manholes, bridge foundations, and other structures for which excavation is not otherwise provided; the removal of all old structures, including abutments, piers and wingwalls, unless otherwise specified or directed; in accordance with these Specifications and in reasonably close conformity with the lines, grades and typical cross sections shown on the Plans or established by the Engineer. It shall include pumping, draining, sheeting, and constructing cribs and cofferdams if necessary.

212.2-MATERIALS:

Select material for backfilling shall be crushed stone, gravel, slag, or any combination thereof meeting the requirements of 703. The grading shall be such that 100 percent of the material passes the 2 in. (50 mm) sieve and 0 to 5 percent passes the No. 16 sieve. Any of the standard coarse aggregate sizes from AASHTO No. 4 through AASHTO No. 8 as shown in 703.4 will be acceptable.

Controlled low strength material shall meet the requirements of 219

Quality control of select material for backfilling is the responsibility of the Contractor as specified in 106.1.

The material shall be tested according to applicable methods specified in 716. The sampling frequency for gradation is specified in MP 717.04.21.

Acceptance for gradation will be on the basis of the Contractor's written certification that all such materials used for this item conforms to the specified requirements. The certification is to include the test results.

Engineering fabric shall be Fabric for Subsurface Drainage or Separation meeting 715.11.

CONSTRUCTION METHODS

212.3-GENERAL:

The foundation pits shall be excavated according to the outlines of footings as shown on the Plans and shall be of sufficient size to permit the placing of the full width and length of the footing. The Engineer may order, in writing, such changes in dimensions or footing elevations as may be necessary to secure a satisfactory foundation.

Structural excavation for pipe culverts and underdrains shall be accomplished in accordance with the sections covering pipe culverts and underdrains.

All foundation excavation adjacent to the tracks of any railroad shall be shored, braced and supported as required by the railroad company or the

Engineer, and the Contractor will be held responsible for securing such information and complying. Plans for this shoring, bracing, and supporting shall be submitted to and shall meet with the approval of the Chief Engineer of the railway company before starting excavation. Bracing, shoring, and supporting excavation at structures other than railroad tracks shall meet with the approval of the Engineer.

212.4-DISPOSAL OF MATERIAL:

The excavated material, unless otherwise directed by the Engineer, shall be utilized for backfill or embankments. Surplus material shall be disposed of in such a manner that the efficiency or appearance of the structure shall not be impaired, and the stream not muddied or obstructed.

212.5-COFFERDAMS:

The term cofferdam designates any barrier system that provides a dry, watertight as practicable, area for excavation, inspection or placing concrete. Subject to other requirements in these Specifications, a cofferdam may be constructed of materials including sheet piling, wood, sand bags, earth embankment, etc. or a combination of any of these.

Cofferdams shall, in general, be carried well below the bottom of the footings and shall be well braced and as watertight as practicable. The interior dimensions of cofferdams shall be sufficient to give adequate clearance for the construction of forms and to permit pumping from outside of the forms. When sandy or porous material is encountered in the foundation which renders it impracticable to dewater the excavation before placing masonry, the bottom may be sealed with concrete placed by the tremie method, after which the remainder of the work shall be carried on in the dry.

No bracing of any kind shall be left in cofferdams in such a way as to extend in to the substructure masonry without the written permission of the Engineer.

Cofferdams shall be removed by the Contractor upon completion of the substructure.

212.6-PUMPING:

Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of the passage of water through fresh concrete. No pumping will be permitted during the placing of concrete, or for a period of at least 24 hours, unless it is done with a suitable pump separated from the concrete by a water-tight wall.

212.7-INSPECTION:

After an excavation is completed, the Contractor shall notify the Engineer, and no footing, pipe, or other structure shall be placed until the Engineer has approved the depth of excavation, the character of foundation material encountered, and has obtained the necessary foundation measurements.

212.8-PREPARATION OF FOUNDATIONS:

Rock or other hard foundation material shall be free from all loose material, cleaned and cut to a firm surface, stepped or serrated as directed by the Engineer. All seams shall be cleaned and filled with concrete, mortar, or grout. Excavation in rock shall be made to the neat lines of the footing as nearly as practicable and the concrete placed against the rock without forming.

When masonry is to rest on an excavated surface other that rock, special care shall be taken not to disturb the bearing surface, and the final removal of foundation material shall not be made until just before masonry is to be placed.

212.9-DRAINAGE:

Adequate drainage for the backs of retaining walls, abutments and wing walls shall be provided by outlet tile or pipe drains extending through the walls at the ground line or as indicated on the Plans. In case the outlet end of these drains is below the ground line or would be covered by fill material, the drains shall connect to pipe outlets or be extended to the toe of the slope of the fill. When drain pipes are not called for or indicated on the Plans for these drains, the drains shall be constructed to a minimum sectional area of 24 by 24 in. (600 by 600 mm) and shall consist of sand, crushed stone, or gravel. Excavation and backfilling shall conform to the requirements of this Specification.

When underdrains with pipe are shown or indicated on the Plans and there are bid items for the same, they shall conform to the applicable requirements of 606.

The back of retaining walls, abutments and wing walls shall have porous drains, 1 ft. (300 mm) thick or as shown on the Plans, placed on the back side of the walls and abutments for the entire length and height of the same, beginning at the elevation of the outlet drains.

212.10-BACKFILLING:

Backfill material shall be suitable random material, controlled low strength material or select backfill material. Random material shall be free from particles larger than 3 inches (75 mm), frozen lumps, wood, or other extraneous material. Unless otherwise specified in the plans, any of the types of controlled low strength material may be used and shall be an alternative to random material at the contractor's option. Select backfill material shall be in accordance with 212. Controlled low strength material shall be in accordance with 219.

All spaces excavated and not occupied by abutments, piers, or other structures shall be backfilled to the surface of the surrounding ground. All backfill, except controlled low strength material, shall be thoroughly compacted by rolling or tamping as prescribed below and the top surface neatly graded.

Random material and select backfill material behind and around abutments, wingwalls, piers, bents, pedestals and all other structures, including those inaccessible to a roller, shall be compacted in layers not to exceed 4 inches (100 mm) after compaction. Controlled low strength material shall be placed according to 219.

The quality control and acceptance of controlled low strength material shall

be in accordance with 219.

The quality control and acceptance for compaction of random material shall be in accordance with applicable sections of 207 and 716. Five density tests shall be performed for quality control. The target percentage of dry density shall be 95%.

Special precautions shall be taken to prevent any wedging action against the masonry and the slope bounding the excavation for abutments and walls. Such condition shall be prevented by stepping or serrating to destroy wedge action. Jetting of fill behind retaining walls, abutments, and wing walls will not be permitted. Backfill over and around abutments, culverts, arches, and columns shall be brought up uniformly to avoid bending ordistortional stresses in the structures, shall be made as soon as practicable after forms are removed, and shall be sloped to drain. The 4 in. (100 mm) layer requirement and compaction for backfill in water will be waived. The testing of backfill compaction, at piers or other structures, which will not become part of an embankment or highway pavement or shoulder area will be waived.

Select backfill material shall be placed behind abutments, wingwalls, retaining walls, and box culverts to the dimensions shown on the Plans. The material shall be placed in horizontal layers not to exceed 4 inches (100 mm) compacted.

The quality control testing and acceptance for the select backfill material shall be in accordance with applicable sections of 207 and 716.

A lot shall normally consist of the quantity of backfill material required to fill behind and around abutments, wingwalls, piers, bents, pedestals and all other structures as approved by the Engineer.

The select backfill materials shall be tested according to MP 700.00.24. Five density tests shall be performed for quality control. The target percentage of dry density shall be 95%.

In all areas where select backfill will contact random material, engineering fabric shall be placed in accordance with the last paragraph of 207.9.

212.11-METHOD OF MEASUREMENT:

The quantity of work done for Item 212001-*, "Structure Excavation", Item 212002-*, "Wet Excavation", Item 212003-*, "Rock Excavation" and Item 212005-*, "Select Material for Backfilling", will be the number of cubic yards (meters) established in the Proposal. Any additional work beyond the scope of the Plans, authorized by the Engineer, will be measured incubic yards (meters) for the excavated material removed or Select Backfill in place and paid for in accordance with the Subsection and 109.2. Measurement for "Structure Excavation" and "Wet Excavation" will be limited to the volume bounded by vertical planes 18 in. (450 mm) outside the neat line of footings and parallel thereto; "Rock Excavation" will be limited to the volume bounded by the neat lines of the footings.

When an increase in depth of foundation has been ordered by the Engineer, the excavation for the first 5 ft. (1.5 meters) or fraction thereof below the elevation shown on the Plans will be paid at the unit bid price. The Engineer

may require the Contractor to make excavation to a depth greater than 5 ft. (1.5 meters) below Plan elevation in accordance with 104.3.

All excavation performed under this section will be classified as "Structure Excavation", except as stated. When the Plans specify "Rock Excavation", all material encountered in the excavation requiring blasting for its removal and all boulders greater the ½ cu. Yd. (0.4 cubic meters) in volume will be considered as "Rock Excavation" and be paid for as such. When a quantity of "Wet Excavation" is shown on the Plans, and a normal pool elevation is indicated, excavation below the normal pool elevation, except that classified as "Rock Excavation", will be considered "Wet Excavation" and will be measured below normal pool elevation from the stream bed to the bottom of the footings.

The cost of bracing, shoring and supporting excavation adjacent to railroad tracks and other structures shall be included in the unit price bid for "Structure Excavation", "Wet Excavation", or "Rock Excavation".

Structural excavation for old structures requiring removal will be limited to the outside dimensions of the structure.

Excavation for the drains specified in 212.9 will be paid as Item 212001-*, "Structure Excavation", and the cost of backfilling drains with sand, crushed stone or gravel shall be included in the price bid for "Structure Excavation".

Clearing of right-of-way within the construction limits of piers, abutments, retaining walls, etc., and backfilling to the level of the original ground will be included in unit prices bid for "Structure Excavation", except that select material for backfilling will be paid for under Item 212005-*. If backfill above original ground is required, material for the backfill will be measured and paid for as prescribed under 207 or 211.

The measurement and payment for engineering fabric will be included in the unit price bid for "Select Material for Backfilling".

Item 212004-* "Cofferdams", will be measured and paid for each unit complete in place, including their removal, and shall include all labor, materials, and equipment incidental to the construction, pumping and removal. Progress payments, determined by the Engineer, may be made.

212.12-BASIS OF PAYMENT:

The quantities, measured as provided above, will be paid for at the contract unit price bid for these items, which prices and payments shall be full compensation for furnishing all materials and doing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work, and also including cost of cofferdams and their removal, except when a separate bid item is provided for Item 212004-*, "Cofferdams".

212.13-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
212001-*	STRUCTURE EXCAVATION	CUBIC YARD (METER)
212002-*	WET EXCAVATION	CUBIC YARD (METER)

217.1

ITEM	DESCRIPTION	UNIT
212003-*	ROCK EXCAVATION	CUBIC YARD (METER)
212004-*	COFFERDAM	EACH
212005-*	SELECT MATERIAL FOR BACKFILLING	CUBIC YARD (METER)

*Sequence number

213 THROUGH 216-BLANK

SECTION 217
SPECIAL ROCK FILL

217.1-DESCRIPTION:

This work shall consist of furnishing and placing at the foot of embankments, inside or outside the neat line, where called for on the Plans or as directed by the Engineer, durable rock in accordance with the Specifications and in reasonably close conformity to the lines, grades, dimension and sections shown on the Plans

217.2-MATERIALS:

The rock for special rock fill shall meet the requirements specified in 704.5.

217.3-CONSTRUCTION METHODS:

Where possible, the material shall behandled as ordinary rock embankment as prescribed in 207.7.3; however, if the location for the special rock fill is not accessible to ordinary placing, the material may be placed by other methods.

Foundation trenches and other necessary excavations shall be excavated by the Contractor, in accordance with the applicable provision of 212, and approved by the Engineer before the placing of the special rock fill is begun. Unless otherwise shown on the Plans or directed by the Engineer, the rock fill shall extend approximately 2 ft. (600 mm) below the bed of the stream.

217.4-METHOD OF MEASUREMENT:

The quantity of work done will be measured in cubic yards (meters) of "Special Rock Fill", complete in place and accepted, determined by the method of average end areas.

217.5-BASIS OF PAYMENT:

The quantity, determined as provided above, will be paid for at the contract unit price bid for this item, which price and payment shall be full compensation for furnishing all the material and doing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, and incidentals necessary to complete the work.

217.6-PAY ITEM: